

II. ELEMENTS OF AN O&M PROGRAM
B. WORK PRACTICES FOR CLEANING, MAINTENANCE
AND RENOVATION

B. WORK PRACTICES FOR CLEANING, MAINTENANCE AND RENOVATION

The central focus of the O&M program is a set of work practices for the custodial, maintenance, and construction staffs. These include procedures for using protective equipment.

1. CLEANING PRACTICES

Proper cleaning is important for two reasons:

- a. Any building with friable ACM may be contaminated with fibers released by previous disturbance or deterioration of the ACM.
- b. Cleaning conducted in a careless manner may cause damage to the ACM, thus releasing more fibers.

Proper cleaning involves the use of specially filtered vacuum cleaners and "wet-wipe" techniques.

Special cleaning practices are appropriate for any building with surfacing ACM or thermal system insulation containing asbestos. If the building contains only "other" (usually nonfriable ACM), or if all of the ACM is isolated behind airtight barriers, special cleaning practices may not be needed. Furthermore, where the ACM is confined to a single room or area, cleaning just that area may be sufficient. Where the ACM is more widespread and where fibers can be transported by the ventilation system, special cleaning practices should be extended to the entire building.

Detailed descriptions of special cleaning practices are provided in Exhibit II.B.1.

2. MAINTENANCE PRACTICES

Work practices for maintenance work should address four types of projects:

- a. Those which are unlikely to involve any contact with ACM
- b. Those which may cause accidental disturbance of ACM
- c. Those which involve small-scale manipulation or removal of ACM
- d. Those which involve large-scale manipulation or removal of ACM

Recommended practices are tailored to the likelihood and severity of ACM disturbance and the potential for exposure of workers and other building occupants to airborne asbestos. Respiratory protection is recommended for each type of maintenance activity.

Special work practices are only required where disturbance of ACM is likely. For example, simply changing light bulbs in fixtures located near ACM would normally create little chance of disturbance. Likewise, work around nonfriable ACM is not likely to cause fiber release unless the ACM is directly manipulated such as by drilling or cutting. However, if in doubt about the possibility of disturbing ACM during maintenance activities, take adequate precautions to minimize fiber release and building contamination.

Detailed descriptions of special work practices for building maintenance are provided in Exhibit II.B.2.

3. RENOVATION AND REMODELING PRACTICES

Renovation of a building or replacement of utility systems implies a high potential for disturbance of ACM. Removal of the ACM before renovation begins is advised. Removal is required by the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for projects which would break up or make inaccessible for future removal any more than a specified minimum amount of ACM (260 square feet of surfacing material and 160 linear feet of thermal system insulation).

Remodeling or redecorating may also cause significant release of asbestos fibers. Again, NESHAPs may require removal of ACM prior to remodeling.

Respirators are recommended for all renovation and remodeling projects. Detailed descriptions of special renovation and remodeling work practices are provided in Exhibit II.B.3.

EXHIBIT II.B.1

SPECIAL CLEANING PRACTICES

Special cleaning practices should be followed in buildings with ACM. Without them, cleaning may resuspend previously settled fibers and raise the level of asbestos in the air. Special practices also reduce the possibility of accidentally disturbing the ACM.

Special cleaning practices are appropriate for any building with surfacing ACM (particularly if the material is friable) or asbestos-containing thermal system insulation. If the building contains only "other" (usually nonfriable) ACM, if all the ACM is isolated behind airtight barriers, or if thermal system insulation is completely enclosed by protective jackets in good repair, special cleaning practices may not be needed. Where ACM is confined to a single room or area, cleaning just that area may be sufficient. Where the ACM is more widespread the where fibers can be transported by the ventilation system, special cleaning practices should be extended to the entire building.

Custodians should be instructed to avoid bumping pipes and walls or other surfaces with brooms, mops, vacuum cleaners, and other cleaning equipment. These disturbances are likely to cause the release of asbestos fibers, even if the ACM has been encapsulated. Dry brooms, mops, dust cloths, and standard vacuum machines will simply resuspend fibers. All dusting and mopping in buildings with ACM should be conducted using wet cleaning techniques (mops or cloths dampened with water or a dust suppressant) or with vacuum cleaners equipped with HEPA filters.

- * All curtains, books, upholstered furniture, carpets, and other irregular surfaces should be vacuumed with an HEPA-vacuum cleaner at least monthly.
- * All noncarpeted floors should be wet mopped, and all other horizontal surfaces such as the tops of light fixtures and file cabinets should be wiped with damp cloths on a regular basis. Alternatively, these surfaces can be HEPA-vacuumed.
- * Spray (mist) bottles of water should be used to keep the mops and cloths damp. Alternatively, a dust suppressant can be used on mops.
- * Cleaning materials (mop heads, cloths, and HEPA filters) should be washed after each cleaning, changed at least weekly, and discarded as asbestos waste--the materials should be placed in 6 mil plastic bags, the bags sealed and labeled "DANGER--CONTAINS ASBESTOS FIBERS--AVOID CREATING DUST--CANCER AND LUNG DISEASE"--could be stored in labeled 55-gallon drums (or other durable containers) in secure areas on-site. A disposal company could then transport the waste to an appropriate landfill periodically.
- * HEPA filters should be removed from vacuum cleaners with great care. Consult manufacturer's instructions on filter removal. Workers should wear at least air-purifying respirators and should mist the filters with water as they are removed. Some building owners employ outside contractors to change HEPA filters.
- * Ladders, mops, buckets, vacuum cleaners, and all cleaning equipment should be washed or wiped with damp cloths when the cleaning is finished. (Cloths should be discarded as described above.)

EXHIBIT II.B.2

SPECIAL WORK PRACTICES FOR BUILDING MAINTENANCE

Normal maintenance activities can disturb ACM and raise levels of airborne asbestos. Maintenance workers should be cautioned against conducting any maintenance work in a manner that may disturb ACM.

The nature and extent of special work practices should be tailored to reflect the likelihood that the ACM will be disturbed and that fibers will be released. Four categories of potential disturbance are defined: (1) contact with the ACM is very unlikely, (2) accidental disturbance is possible, (3) a small amount of ACM (less than three square feet or three linear feet) will be disturbed, and (4) a large amount of ACM (three or more square feet or linear feet) will be disturbed. Table II.B.2. summarizes key aspects of the recommended work practices for each of these categories of potential disturbance. The following sections on surfacing materials, thermal system insulation, and other types of ACM describe the work practices in detail.

TABLE II.B.2. SUMMARY OF SPECIAL PRACTICES FOR MAINTENANCE WORK

Likelihood of ACM Disturbance

	Contact Very Unlikely	Accidental Disturbance	Disturbance Intended or Likely <u>Small</u>	<u>Large</u>
Approval needed	No	Yes	Yes	Yes
Special scheduling or access control	No	Yes	Yes	Yes
Supervision needed	No	Initial	Yes	Yes
HVAC system modification	None	If possible	Shut Down	Shut Down
Containment	None	Drop cloths	Complete	
Respiratory protection	Available	Yes	Yes	Yes
Protective clothing	None	Yes	Yes	Yes
Use of Wet methods	No	As needed	Yes	Yes
Use of HEPA vacuum	Available	Yes	Yes	Yes
Personal	No	Dry	Wet	Wet

A. SURFACING MATERIALS

1. Contact with ACM Unlikely

In some buildings with ACM, many routine maintenance activities can be conducted without contacting the ACM. For example, changing light bulbs in a fixture on a ceiling with asbestos-containing plaster can usually be performed without jarring the fixture or otherwise disturbing the ACM. (The top of the fixture should have been wet-cleaned previously to remove settled fibers.) In these situations, few precautions other than normal care are needed. Table II.B.2. notes that the only precaution is to assure the availability of respirators and an HEPA vacuum if needed. These do not have to be taken to the site but should be available at a known location in the building. Where maintenance is performed in parts of the building free of ACM, no special precautions are usually necessary. An exception would be work causing vibrations at a distant location where ACM may be present.

2. Accidental Disturbance of ACM Possible

Routine maintenance and repair includes work on light fixtures, plumbing fixtures and pipes, air registers, HVAC ducts, and other accessible parts of building utility systems. Where these fixtures or system parts are near friable ACM, maintenance work may unintentionally disturb the ACM and release asbestos fibers.

For example, maintenance work on ventilation ducts in an air-handling room where asbestos fireproofing is present only on structural beams could be conducted without contacting the ACM. However, the fireproofing could be disturbed accidentally during the course of the work.

The following precautions and procedures should be used if accidental disturbance of ACM (or dust and debris containing asbestos fibers) is possible:

- * Approval should be obtained from the asbestos program manager before beginning work. The asbestos program manager or supervisor should make an initial visit to the work site.
- * The work should be scheduled after normal working hours (nights or weekends), if possible, or access to the work area should be controlled: doors should be locked from the inside and signs posted to prevent unauthorized persons from entering the work area (e.g., "MAINTENANCE WORK IN PROGRESS, DO NOT ENTER," or, if asbestos levels are high enough to trigger the OSHA Rule (the PEL or higher), "DANGER--ASBESTOS; CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN Note: Emergency exits must remain in operation.
- * The air-handling system should be shut off or temporarily modified to prevent the distribution of any released fibers to areas outside the work site.

- * A 6-mil polyethylene plastic dropcloth should be placed beneath the location of the maintenance work, extending at least 10 feet beyond all sides of the work site. Alternatively, a rectangular enclosure constructed of 6-mil plastic on a frame can be positioned underneath the maintenance areas to inhibit the spread of fibers from fallen ACM. (Mobile enclosures of this type are available commercially.)
- * Workers should wear at least air-purifying respirators with HEPA filters and protective clothing including a body suit and hood.
- * The ACM in the vicinity of the maintenance work should be misted lightly with amended water--a combination of a surfactant and water. Use a mister that produces a very fine spray. Be sure that the electrical system is shut off before spraying around any electrical conduits or fixtures.
- * After the maintenance work is completed, the fixture, register, or other components, and all tools, ladders and other equipment should be HEPA-vacuumed or wiped with a damp cloth.
- * If any debris is apparent on the drop cloth, floor, or elsewhere, it should be HEPA-vacuumed.
- * The plastic dropcloth (or enclosure) should be wiped with a damp cloth, carefully folded, and discarded as asbestos waste.
- * All cloths, vacuum bags/filters, and other disposable materials should be discarded in sealed and labeled plastic bags as asbestos waste.
- * Workers should HEPA-vacuum respirators and protective clothing at the work site. The clothing should then be discarded as asbestos waste. The clothing should then be discarded as asbestos waste. If the ACM was disturbed during the course of the work, the workers should leave their respirators on, proceed to a shower room, shower with respirators on, and clean their respirators while in the shower.

3. Disturbance of ACM Intended or Likely

Some maintenance and repair activities will unavoidably disturb the ACM. For example, installing new sprinkler or piping systems will necessitate hanging pipes from structural members or ceilings. If the beams or ceilings are ACM, the ACM will be scraped away to install hangers. Likewise, pulling cables or wires through spaces with ACM or ACM debris is likely to dislodge pieces of the ACM or disturb ACM debris. Furthermore, any time tiles are moved to enter the space above a suspended ceiling, settled dust on top of the tiles will be resuspended. If the beams or decking above the ceiling are covered with ACM, the dust is likely to contain asbestos fibers. All of these examples involve disturbance of ACM or asbestos dust and debris, and will likely result in elevated levels of airborne asbestos fibers.

Small Disturbances

The following procedures are appropriate for maintenance activities which involve small-scale (less than 3 square feet) removal of surfacing ACM or when disturbance of ACM dust and debris or unintentional contact with the ACM is likely.

- * Approval should be obtained from the asbestos program manager before beginning work, and the work should be supervised.
- * The work should be scheduled after normal working hours (nights or weekends) if possible, or access to the work area should be controlled: doors should be locked from the inside and signs posted to prevent unauthorized persons from entering the work area (e.g., "MAINTENANCE WORK IN PROGRESS, DO NOT ENTER," or, if asbestos levels are high enough to trigger the OSHA Rule (the PEL or higher), "DANGER--ASBESTOS; CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND CLOTHING ARE REQUIRED IN THIS AREA"). Note: Emergency exits must remain in operation.
- * The air-handling system should be shut off or temporarily modified to prevent the distribution of fibers from the work site to other areas in the building.
- * Workers should wear at a minimum, powered air-purifying respirators with HEPA filters and protective clothing, including a body suit, hood, boots, and gloves.
- * A 6-mil polyethylene plastic dropcloth should be placed beneath the location of the maintenance work, extending at least 10 feet beyond all sides of the work site. (In the case of entry into the space above a suspended ceiling, the work site would be the area of the tiles removed to gain access.) Alternatively, a rectangular enclosure constructed of 6-mil plastic on a frame can be positioned underneath the maintenance areas to inhibit the spread of fibers from fallen ACM. (Mobile enclosures of this type are available commercially.)
- * If entry to the space above a suspended ceiling is necessary, the entry tile(s) should be removed carefully with as little jarring as possible. The air above the opening, the top of the removed tile and all tiles surrounding the opening, and the ACM likely to be disturbed should be misted with amended water. Use a mister with a very fine spray. A thorough misting of the air helps fibers to settle more quickly. Cleaning ceiling tiles with an HEPA vacuum cleaner is also effective, as long as care is taken not to vibrate tiles and disturb the ACM.
- * Selected workers must wear personal monitors as required by OSHA unless previous experience with the same ACM and similar operations indicates that fiber levels are likely to be less than the PEL.
- * During the course of the work, any ACM which is removed should be collected by the HEPA-vacuum. This is best accomplished by placing the vacuum hose just below the ACM being removed.

- * Upon completion of the work, any visible debris on the top of the suspended ceiling, on the drop cloth or the floor, or anywhere else should be collected by cleaning with an HEPA-vacuum.
- * All equipment and tools should be wiped with damp cloths or HEPA-vacuumed.
- * The plastic sheet should be wiped with a damp cloth, carefully folded, and discarded as asbestos waste.
- * All debris, cloths, and vacuum bags/filters should be discarded in sealed and labeled plastic bags as asbestos waste.
- * Workers should vacuum their disposable suits before leaving the work site (or remove and discard them as asbestos waste and put on a clean disposable suit), proceed to a shower room, shower with respirators on, and clean their respirators while in the shower.

Large Disturbances

Any maintenance work which involves removal of 3 or more square feet of surfacing material (or 3 linear feet of thermal system insulation) should be considered a large-scale disturbance of ACM. Moreover, if the maintenance work is part of general building renovation, NESHAPs require prior removal of ACM if more than about 160 square feet of friable surfacing ACM (or about 260 linear feet of thermal system insulation) would be broken up or made inaccessible for subsequent removal (40 CFR 61, subpart M--see Chapter 1 and Appendix C of the 1985 EPA Guidance Document). Even if NESHAPs does not strictly apply, building owners should consider removing all ACM from that part of the building where this type of maintenance work is planned. Typically, an outside abatement contractor would be hired for the removal project before the maintenance work would begin. If this approach is not deemed necessary or desirable, the maintenance workers should be fully trained in asbestos removal and the work should proceed as follows:

- * All of the procedures for asbestos removal should be followed: construction of containment barriers and decontamination facilities; use of a negative pressure ventilation system; use of protective clothing and "type C" respirators by workers; proper disposal of asbestos debris; and proper cleanup of the work site followed by air testing. Most of these procedures are required by OSHA. Personal air monitoring is also required by OSHA unless SCBA or "type C" respirators are used.
- * Once the work site has been adequately isolated and all precautionary measures have been taken, the maintenance work should begin. If the work involves cutting, drilling, grinding, or amending the ACM, special tools equipped with HEPA vacuum attachments must be used (OSHA requirement). Where the ACM is simply scraped off the substrate, the hose from an HEPA vacuum cleaner should be placed just below the removal site to catch the ACM. Upon completion of the work, the vacuum bags and filters should be discarded as asbestos waste.
- * Where the ACM was disturbed as part of the maintenance activity, it should be repaired with nonasbestos plaster or spackling compound or sprayed/painted with an encapsulant or latex paint. This should be done before final cleanup of the work site.

B. THERMAL SYSTEM INSULATION

Maintenance activities affecting asbestos-containing thermal system insulation generally involve plumbing-type repairs or repairs to the heating, ventilation, and air conditioning (HVAC) system. Frequently, the ACM must be removed to provide access to the valve, flange, duct, or related system part needing maintenance.

1. Contact with ACM Unlikely

Maintenance activities or repairs which can be performed without contacting or disturbing the ACM require little more than normal care and good workmanship. (Respirators and an HEPA vacuum cleaner should be available if needed.) For example, valves which are either uncovered or covered with nonasbestos insulation can be repacked or repaired without disturbing asbestos lagging on nearby pipes. As with surfacing ACM, the only precautions necessary are to make sure that an HEPA vacuum cleaner and air-purifying respirators are available if needed.

2. Accidental Disturbance of ACM Possible

Even maintenance tasks that involve no direct contact with ACM may cause accidental disturbance. For example, vibrations caused by maintenance activities in one part of the piping network will be transmitted to other parts. Vibrations could then cause fibers to be released from insulation which is exposed (not covered with a protective jacket) or not in good condition. If in doubt about the possibility of fiber release, thoroughly inspect the thermal system insulation before undertaking the maintenance or repair work. Then, either correct the problem before starting or assume that the maintenance work may cause accidental disturbance and fiber release. In this case, the following procedures should be used:

- * Work approval and site preparation procedures as described under Surfacing Material should be followed.
- * Plastic sheets (6-mil polyethylene) should be cut and taped around any insulation which might be accidentally disturbed. The plastic should be misted with amended water before taping it shut. If the locations where insulation could be disturbed are too numerous for isolation with plastic, workers should perform the maintenance work wearing air-purifying respirators at a minimum and protective clothing, including disposable suits and hoods.
- * Cleanup procedures as described under Surfacing Material should be followed. Special care should be taken when removing the plastic from the insulation to minimize disturbance of any ACM dust or debris that may have fallen from the insulation.

3. Disturbance of ACM Intended or Likely

Where asbestos-containing insulation must be removed to maintain or repair the thermal system, the ACM will obviously be disturbed. As with surfacing ACM, the amount to be removed or manipulated will determine the procedures to be used.

Small Disturbances

If the amount to be removed is 3 linear feet or less (3 square feet for surfacing material), the project should be considered a small-scale disturbance. The following procedures should be followed:

- * Work approval and site preparation procedures as described for surfacing ACM should be followed.
- * Maintenance workers should wear at least air-purifying respirators with HEPA filters and protective clothing (suit, hood, and boots) in case of a fiber release accident.
- * The asbestos-containing insulation should be removed as necessary for the repairs, and the repairs made using standard glove bag techniques where possible. Glove bags are fastened around the part to be repaired, the insulation is removed with knives and saws to make the part accessible, and the repairs are made using tools contained in the glove bag tool pouch. The open faces of the remaining asbestos-containing insulation are then sealed with an encapsulant or latex paint, all surfaces are wet-wiped or HEPA-vacuumed, and all debris is sealed in the glove bag and removed together with the bag.
- * If a glove bag is ruptured during the course of the repairs, work should stop, the area should be sealed off, and all procedures recommended for large-scale asbestos removal should be followed. Thorough cleanup of the work site followed by air testing is especially important to assure that fibers which may have escaped are removed. Sealing tape applied quickly to a small puncture could prevent significant release of fibers to the room, provided the ACM inside the bag was thoroughly wetted as it was removed.
- * At the conclusion of the work, maintenance workers should clean their clothing as above (if fibers escaped from the glove bag), shower with their respirators on, and clean their respirators while in the shower.
- * All glove bags and any other used materials (including disposable clothing) should be discarded as asbestos waste.
- * Nonasbestos insulating material can be installed as necessary to replace insulation which was removed.

Large Disturbances

Maintenance activities which involve removal of 3 linear feet or more of asbestos-containing insulation (e.g., several valves need attention in a utility room or block insulation needs to be removed for boiler repair) should be considered large-scale disturbances. In some situations glove bag techniques may be appropriate and the procedures described above under "Small Disturbances" should be followed. When glove bags are not feasible, the maintenance activities should be conducted using all the procedures recommended for large-scale asbestos removal. ACM removal is typically conducted by abatement contractors. If maintenance personnel are to conduct the removal, they must be thoroughly trained in removal techniques (OSHA requirements). The choice between conducting multiple glove bag operations and isolating the entire work site is largely one of convenience and cost. However, if the maintenance activities are likely to cause disturbance of ACM on pipes, boilers, or ducts at sites other than just those undergoing repair (due to vibration, for example), then the entire room or area should be isolated and large-scale asbestos removal procedures employed. NESHAPs regulations require that asbestos-containing thermal system insulation be removed prior to building renovation if 260 linear feet or more of ACM would be broken up or made inaccessible for subsequent removal prior to demolition. (As noted in the previous section, NESHAPs also requires the removal of friable surfacing ACM prior to renovation if 160 square feet or more of material would be broken up or made inaccessible.

C. OTHER ACM

Other types of ACM should also be addressed in the special O&M program. They include vinyl asbestos floor tiles, asbestos ceiling tiles, transite wall board and counter tops, asbestos roof tiles, and various textile products such as stage curtains. Disturbance of these materials should be avoided. Where this is not possible, procedures should be used as described above for large-scale removal of ACM. Cutting, drilling, grinding, or sanding of ACM must be performed with tools equipped with HEPA-filtered vacuum systems (OSHA requirement).

D. OTHER MEASURES

Whenever friable ACM is present in a building, special procedures should be followed when changing filters in the HVAC system. The filters should be misted with water or amended water as they are removed, placed in plastic bags, sealed, and discarded as asbestos waste. Workers should wear at least an air-purifying respirator.

EXHIBIT II.B.3

SPECIAL RENOVATION AND REMODELING PRACTICES

A. RENOVATION

Building renovation or building system replacement can cause major disturbance of ACM. Moving walls, adding wings, and replacing heating or air conditioning systems involve breaking, cutting, or otherwise disturbing ACM that may be present. Prior removal of ACM is highly recommended in these situations and is required by NESHAPs if the amount of ACM likely to be disturbed is greater than the threshold amounts (160 square feet of surfacing material or 260 linear feet of thermal system insulation). If prior removal is not undertaken, the renovation project should be considered equivalent to an asbestos removal project. All the procedures and precautions for asbestos removal recommended by EPA and required by OSHA as previously discussed should be employed. A key step in considering a renovation project is checking on the location and type of ACM that may be affected. Clearance should be obtained from the asbestos program manager before serious project planning is begun.

B. REMODELING

Remodeling or redecorating implies less dramatic structural alteration. However, disturbance of ACM or materials contaminated with asbestos fibers is still possible. Where the remodeling involves direct contact with ACM (e.g., painting or wallpapering over ACM), all of the procedures and precautions recommended by EPA and required by OSHA for asbestos removal should be followed.

If "other" types of ACM have to be removed as part of the renovation project, the removal should be done with care to avoid breaking the material. For example, small sections of asbestos-containing floor tiles can be removed by applying dry ice or heat from a portable heater to the tops of the tiles and then prying them up. Glued carpet may require a mechanical chipper to separate the carpet from the floor. Before a chipper is employed, test the carpet adhesive for asbestos. If it contains asbestos, all workers should wear either SCBA or "type C" respirators and the project should be treated as an asbestos removal project.

II. ELEMENTS OF AN O&M PROGRAM
C. POTENTIAL FIBER RELEASE EPISODES

II. ELEMENTS OF AN O&M PROGRAM

C. POTENTIAL FIBER RELEASE EPISODES

Special procedures are needed to minimize the spread of fibers throughout the building after major fiber release episodes such as the collapse of an asbestos-containing ceiling or wall. Barricades should be erected and all procedures required for ACM removal should be employed. This includes full respiratory protection for workers. Procedures specified for maintenance and renovation projects can be used for less serious events.

Detailed descriptions of procedures for fiber release episodes are provided in Exhibit II.C.1.

EXHIBIT II.C.1

PROCEDURES FOR FIBER RELEASE EPISODES

As long as ACM remains in the building, a fiber release episode could occur. Custodial and maintenance workers should report to the asbestos program manager the presence of debris on the floor, water or physical damage to the ACM, or any other evidence of possible fiber release. Fiber release episodes can also occur during maintenance or renovation projects. The asbestos program manager should call an abatement contractor or assign a suitably trained in-house team to clean up debris and make repairs as soon as possible. If an outside contractor is to be used, a company should be selected and retained by contract for quick response action as needed.

A. MINOR EPISODES

Minor episodes such as a small section of insulation (less than 3 linear feet) falling from a pipe or a careless worker bumping into a beam and dislodging a small amount of fireproofing ACM (less than 3 square feet) can be treated with standard wet cleaning and HEPA-vacuum techniques:

- * Workers should wear air-purifying respirators with HEPA filters at a minimum.
- * Worker should thoroughly saturate the debris with water or amended water using a mister with a very fine spray. The debris should then be placed in a labeled, 6-mil plastic bag for disposal, and the floor should be cleaned with damp cloths or a mop. Alternatively, the debris can be collected with an HEPA vacuum cleaner.
- * All debris and materials used in the cleanup should be discarded as asbestos waste.
- * Workers should vacuum their disposable suits before leaving the work site (or remove them, discard them as asbestos waste, and put on clean disposable suits), proceed to a shower room, shower with their respirators on, and clean their respirators while in the shower.
- * The damaged ACM should be repaired with asbestos-free spackling, plaster, cement, or insulation, or sealed with latex paint or an encapsulant.

B. MAJOR EPISODES

Major fiber release episodes are serious events. Large amounts of ACM falling from heights of several feet may contaminate an entire building with asbestos fibers. If 3 square feet or more of surfacing ACM or 3 linear feet or more of thermal system insulation delaminates or is dislodged from its substrate, the episode should be considered major. A large breach in a containment barrier for a maintenance or abatement project should also be considered a major episode. The following response procedures should be used:

- * The area should be isolated as soon as possible after the ACM debris is discovered. Where the area can be sealed by doors, they should be locked from the inside (escape corridors must remain in operation) and signs posted to prevent unauthorized personnel from entering the work area ("DANGER--ASBESTOS: CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA").

- * The air-handling system should be shut off or temporarily modified to prevent the distribution of fibers from the work site to other areas of the building. If possible, doors, windows, and air registers should be sealed with 6-mil plastic sheets and tape.
- * All the procedures recommended by EPA and required by OSHA for large-scale removal of ACM should then be used. These include containment barriers, negative pressure ventilation, personal respiratory protection and protective clothing, decontamination facilities, and air testing.
- * Workers should wear either an SCBA or "type C" respirator and protective clothing, including a body suit, hood, boots, and gloves. Personal air monitoring may be conducted on representative workers, but is not required by OSHA when SCBA or "type C" respirators are used.
- * Fallen debris should be sprayed with amended water and placed in plastic bags for disposal. Shovels are useful for collecting the debris. The floor should be thoroughly cleaned with an HEPA vacuum cleaner.
- * Walls, ceilings, pipes, boilers or other surfaces where ACM was damaged or delaminated should be repaired temporarily. This might involve replastering with asbestos-free material, spraying with an encapsulant, or taping with duct tape. In some cases, ACM beyond the immediate area of damage may need to be removed to prevent additional episodes.
- * The air should be tested for asbestos fibers before the plastic barriers are removed and the area reoccupied. That is, air should be sampled at the specified number of locations and analyzed by either phase contrast microscopy or transmission electron microscopy. However, sampling should NOT be done aggressively since the use of blowers and fans may dislodge fibers from the remaining ACM.
- * After the barriers have been taken down, a decontamination of the entire building or a portion of it should be considered. The need for this will depend on how rapidly the response team reacted to the episode, and in particular, how quickly the HVAC system was turned off. A thorough decontamination includes HEPA-vacuuming all carpets, furniture, and other surfaces. Decontamination of the HVAC system would involve disassembling and cleaning (HEPA-vacuuming or wet wiping) ducts, ventilators, registers, and other system parts. System filters should also be removed and replaced.
- * All equipment used in the cleanup operation should be washed or wiped with damp cloths. All disposable materials (e.g., cloths, mop heads, filters, coveralls) should be discarded as asbestos waste.

Each fiber release episode should be documented. A report format is suggested in Figure II.C.1.

These procedures should be employed whether the building owner uses in-house staff or an outside asbestos abatement contractor. If an outside contractor is used, the procedures should be thoroughly discussed and proper training of the contractor's crew assured before signing the contract.

FIGURE II.C.1
REPORT FORM FOR A FIBER RELEASE EPISODE

FIBER RELEASE EPISODE REPORT

1. Address, building, and room number(s) or description of area) where episode occurred:

2. The release episode was reported by _____ on _____ (date).

3. Describe the episode:

4. The asbestos-containing material was___/was not___ cleaned up according to approved procedures. Describe the cleanup:

SIGNED: _____
(Asbestos Program Manager)

DATE: _____

II. ELEMENTS OF AN O&M PROGRAM
D. RESPIRATORY PROTECTION AND MEDICAL
SURVEILLANCE PROGRAM

II. ELEMENTS OF AN O&M PROGRAM

D. RESPIRATORY PROTECTION AND MEDICAL SURVEILLANCE PROGRAM

A formal respiratory protection program is needed whenever an O&M specifies that service workers have to wear respirators. OSHA regulations require a respirator program whenever workers are likely to be exposed to fiber levels above the PED.

EXHIBIT II.D.1

RESPIRATORY PROTECTION

Proper respiratory protection should be an integral part of all custodial and maintenance activities involving potential exposure to asbestos. OSHA specifies general types of respirators for protection against airborne asbestos during "construction" activities (abatement, renovation, maintenance, repair, and remodeling). The minimum level of required respiratory protection is keyed to the anticipated or PCM-measured level of airborne fibers. However, for maximum protection, both EPA and NIOSH recommend one of the following:

- * A self-contained breathing apparatus (SCBA) with full facepiece operated in the pressure-demand mode (a tank strapped to the worker's back, an air hose, and a facemask; or
- * A "Type C" supplied-air respirator with full facepiece operated in the pressure-demand mode (a facemask connected by a hose to a remote compressor or air tank), combined with an emergency backup of an SCBA operated in the pressure-demand mode.

SCBA and "type C" respirators may not be practical for some custodial and maintenance jobs. Where these jobs are not likely to generate high levels of airborne asbestos, respirators which filter breathing air should be used. The options are:

- * An air-purifying respirator with replaceable HEPA filters and either a half or full facepiece.
- * A powered air-purifying respirator with replaceable HEPA filters and either a half or full facepiece (a pump assists breathing and provides positive pressure in the facepiece).

Single-use, disposable respirators (dust masks) do not seal properly around the face; they NEVER provide adequate protection. Only respirator brands approved by NIOSH should be used.

Selecting the most appropriate respirator for each O&M task requires knowledge of the levels of airborne asbestos generated by the task or likely to be present where the task is performed. This knowledge is best gained through air monitoring conducted during the task (as required by OSHA whenever fiber levels are expected to be above the PEL) or from asbestos levels measured during similar tasks. The following recommendations for respiratory protection during various custodial and maintenance tasks are based in part on measured fiber levels during maintenance activities as reported by OSHA. The recommendations go beyond the OSHA requirements and cover activities which may not create routine provisions. The list should be used as a rough guide to indicate the MINIMUM EPA-recommended respiratory protection for each task.

- * Routine maintenance where contact with ACM is unlikely; no respiratory protection recommended, air-purifying respirator with HEPA filters should be available if needed.

- * Routine maintenance where accidental disturbance of the ACM is possible: air-purifying respirator with HEPA filters.
- * Maintenance or repair involving intentional small-scale disturbance of ACM: powered air-purifying respirator with HEPA filters, or air-purifying respirator with HEPA filters if glove bags are used to contain the ACM during disturbance.
- * Any activity involving cutting, drilling, grinding, or sanding ACM (HEPA-filtered vacuum attachments are required on all equipment): powered air-purifying respirator with HEPA filters.
- * Cleanup after a minor fiber release episode; air-purifying respirator with HEPA filters.
- * Cleanup after a major fiber release episode; SCBA or "type C" respirator.

Note that any employee required by OSHA to wear an air-purifying respirator (that is, for fiber levels between 0.2 and 10.0 f/cc, 8-hour time-weighted average) can request a power air-purifying respirator.

Selection of appropriate respirators is only one aspect of a respiratory protection program. Other elements include written operating procedures, medical examination of workers, user training, respirator fit testing, respirator cleaning and care, and work-site supervision. The respirator program is usually administered by the asbestos program manager or an appointee.

Physical examinations are required by OSHA for any employee exposed to fiber levels at or above the action level (0.1 f/cc 8-hour time-weighted average) for at least one day per month or for at least 30 days per year or for any employee required to wear an air-purifying respirator. Preplacement, annual, and termination exams are required for these employees. EPA recommends physical examinations, including cardiac and pulmonary tests, for any employee required by the building owner to wear a respirator. These tests determine whether workers will be unduly stressed or uncomfortable when using a respirator.

A certified industrial hygienist or health professional should assist workers with respirator selection and fitting, and train them in respirator use. Fit testing is essential since respirators which leak at the face seal provide significantly less protection. OSHA requires fit-testing every six months for employees required to wear air-purifying respirators.

Respirator effectiveness is also influenced by handling, cleaning, and storage practices. Respirators should be cleaned under running water after use. (Each worker should wear the respirator in the shower and thoroughly clean the facepiece before removal.) Respirators should also be cleaned periodically using a sanitizing solution. The HEPA filters should be discarded as asbestos waste, the respirator placed in a plastic bag (labeled with the worker's name) and stored in a secure place. Respirators should be inspected after each use, during cleaning, and at least monthly when not in use. Inspection records must be maintained.

MEDICAL SURVEILLANCE

According to the OSHA Asbestos Standard for the Construction Industry (29 CFR 1926.58), the OSHA Asbestos Standard for General Industry (29 CFR 1910.1001), and the US EPA Worker Protection Rule (40 CFR 763.120), any employee who is exposed to at least 0.1 f/cc of asbestos for 30 or more calendar days per year, or any employee required to wear a negative pressure (cartridge) respirator, must be involved in a medical surveillance program.

In the O&M program, the use of negative pressure respirators will dictate involvement in the medical surveillance program for most custodial and maintenance workers.

The purpose of the medical surveillance program is to establish an employee's fitness for duty (to wear a respirator, etc.), and to detect any changes in the gastrointestinal and cardiopulmonary systems, changes which may indicate the presence of an asbestos-related disease.

The main requirements of the medical surveillance program are the initial and periodic examinations. The initial examination can be omitted if the employee has had an equitable exam within the last twelve months. Periodic examinations are required at least annually, and must be performed before the employee is issued and required to wear a negative pressure respirator.

Each examination must include, at a minimum:

- * Completion of the mandatory medical questionnaire. There is one each for the initial and periodic examinations. These questionnaires also include sections on work history, which also must be completed. Copies of both the initial and periodic questionnaires are included at the end of this section.
- * A physical examination, with emphasis on the cardiovascular and gastrointestinal systems.
- * A pulmonary function test, which includes the forced vital capacity (FVC) and the forced expiratory volume in one second (FEV).

The examining physician may also require other tests as part of the medical examination. The chest x-ray is now optional and is administered at the discretion of the physician. However, it is recommended that an initial chest x-ray be used in order to establish baseline conditions for the employee.

Following the examination, the physician must provide the employer with the following:

- * A written opinion as to whether the employee has any detected medical conditions that would place the employee at increased risk of health impairment from exposure to asbestos.

- * Any recommended limitations on the employee or on the use of personal protective equipment, such as respirators.
- * A statement that the employee has been informed by the physician of the results of the medical examination, and of any medical conditions that may result from asbestos exposure.

The physician is not to reveal in the written opinion given to the employer any specific findings unrelated to asbestos exposure. Also, the employer must provide a copy of the physician's written statement to the employee within 30 days of receipt.

The employer must provide the examining physician with the following:

- * A copy of the OSHA Asbestos Standard
- * A description of the employer's duties as they relate to asbestos
- * The employee's actual or anticipated level of exposure
- * A description of any personal protective and respiratory equipment used or to be used
- * Information from previous medical examinations of the employee that is not otherwise available to the examining physician

Finally, the employer must maintain medical records for at least 30 years following termination of employment. If the employer goes out of business without a successor, OSHA must be notified at least 90 days prior to termination of business and provide for transfer of records to the secretary of OSHA, if requested.

II. ELEMENTS OF AN O&M PROGRAM

E. TRAINING PROGRAM

II. ELEMENTS OF AN O&M PROGRAM

E. TRAINING PROGRAM

All of the work practices and procedures discussed in this document should be described in writing, placed in a permanent file, and distributed to supervisors and custodial and maintenance workers.

Training workers to use the special procedures and work practices is a key to a successful O&M program. OSHA requires a worker training program for all employees exposed to fiber levels (either measured or anticipated) above the action level.

Three levels of worker training can be identified:

- * Training for custodians involved in cleaning and simple maintenance tasks
- * Training for maintenance workers involved in general maintenance and more complex repair tasks
- * Training for workers who may conduct limited asbestos abatement (removal, enclosure, and encapsulation) or whose work involves direct (intentional contact with ACM.

All three levels of training should include general discussions of the uses and health effects of asbestos, the location of ACM in the building, the overall asbestos control program, and the special O&M program. This should be followed by detailed instruction on work practices, the maintenance work management system, and the use of respirators and protective clothing. The discussion should be tailored to each level of training and should include ample "hands-on" field instructions.

The training program should be conducted by the asbestos program manager or a person trained in asbestos control and O&M programs. The trainer could be a qualified outside consultant. A certified industrial hygienist or health professional should conduct the training on respirator use and medical surveillance procedures. Enrollment in an asbestos abatement course at an EPA-sponsored or state-certified training center may be appropriate for level three training.

Where custodial and maintenance services are performed under contract with a service company, the building owner should insist that the service company's staff has been properly trained for working with ACM. Training should include successful completion of courses on asbestos control and special O&M programs (for example, "Supervision of Asbestos Control Projects," "Asbestos Control Project Monitoring," and "Operations and Maintenance Planning"). Such courses are taught by various states and by each of EPA's five training centers. The company's respirator and medical surveillance programs should be reviewed. In addition, the performance of the company should be checked with other customers, particularly with owners of buildings containing ACM. If the service company meets the training and performance requirements, an initial session should be held with the company's supervisors and workers to inform them of the location of ACM in the building and of all building-specific operating procedures. The asbestos program manager should assume responsibility for ensuring that the service company adheres to all aspects of the special O&M program.

II. ELEMENTS OF AN O&M PROGRAM
F. REGULAR SURVEILLANCE OF THE ACM

II. ELEMENTS OF AN O&M PROGRAM

F. REGULAR SURVEILLANCE OF THE ACM

Keeping track of changes to ACM is an essential part of an effective O&M program. Additional control measures may be necessary if the ACM deteriorates or shows signs of damage or if the potential for disturbance increases.

ACM surveillance is based on periodic physical inspection of the ACM and the building. Air monitoring may be a useful supplement to physical inspection in some situations. Increasing levels of airborne asbestos may signal problems that are not detected by physical inspection alone. Analyzing dust samples for asbestos has also been used to supplement physical inspection. It is not currently recommended by EPA due to a lack of standardized protocols.

Detailed descriptions of ACM surveillance procedures are provided in Exhibit IV.A.1.

EXHIBIT IV.A.1

ACM SURVEILLANCE PROCEDURES

Periodic review of the O&M program is essential to ensure that the program objectives are being met. A key feature of the review is a reinspection of all ACM in the building. Combined with ongoing reports of changes in the condition of the ACM made by service workers, the reinspection will ensure that any damage or deterioration of the ACM will be detected and corrective action taken. Reinspection should be conducted at least annually; more frequently if necessary. The assessment factors are: ACM condition (deterioration, physical damage, and water damage), potential for disturbance (accessibility of the ACM, sources of vibration near the ACM, and potential for air erosion), and location of the ACM in or near air plenums, air shafts, or elevator shafts. Either the asbestos program manager or someone trained or experienced in ACM assessment should conduct the inspections. The results should be documented (see Figure IV.A.1 for an example), and placed in the permanent asbestos file.

Air monitoring could supplement the physical inspection. If air monitoring is conducted, transmission electron microscopy (TEM), not PCM, should be used to count and identify the airborne fibers. Only TEM can detect the small asbestos fibers typically found in buildings with ACM. (Large-scale disturbance of ACM will release larger fibers detectable by PCM.) Since analysis by TEM is expensive, air monitoring which employs TEM is typically used on a one-time basis and provides a "snapshot" view of building conditions. Such a one-time view can be very misleading because airborne asbestos levels vary from day to day and from room to room. Low readings are therefore possible even when the ACM is in poor condition. For this reason, EPA does not recommend air monitoring for the initial assessment of exposure potential. However, if the ACM is currently in good condition, increases in airborne asbestos levels may provide an early warning of deterioration or disturbance of the ACM.

To use air monitoring in an "early warning" context, a baseline asbestos level should be established soon after the O&M program is initiated. Periodic air monitoring (perhaps conducted simultaneously with the reinspections) would then be used to determine if asbestos levels have changed relative to the baseline. Although this use of air monitoring is appropriate and useful in concept, it will still be expensive.

If air monitoring is used in the ACM surveillance component of the O&M program, air sampling and sample analysis procedures should be employed. At least five samples should be collected to establish a baseline, followed by at least five additional samples during each quarterly reinspection of the ACM. Sequential sets of five samples can be averaged and the averages compared statistically to determine whether asbestos concentrations are increasing. Note that aggressive sampling should NOT be used in any area where ACM is present. Special training or expert advice is needed to design and operate an air monitoring system.

FIGURE IV.A.2 ACM REASSESSMENT FORM

REASSESSMENT OF ASBESTOS-CONTAINING MATERIALS

Location of asbestos-containing material(s) (address, building, room(s), or general description):

Boiler room in East Plaza and West Plaza
activity room - Boiler and air handling fans and ducts

Type of asbestos-containing material(s):

- ☒ 1. Sprayed- or troweled-on ceilings or walls:
- 2. Sprayed- or troweled-on structural members:
- 3. Insulation on pipes, tanks, or boilers:
- 4. Other (describe):

Abatement Status:

1. The material has been encapsulated ☒, enclosed ☐, neither ☐.

Assessment:

1. Evidence of physical damage:

No

2. Evidence of water damage:

No

3. Evidence of delamination or other deterioration:

None

4. Degree of accessibility of the material:

Little

5. Degree of activity near the material:

Low

6. Location in an air plenum, air shaft, or airstream:

No

7. Other observations (including the condition of the encapsulant or enclosure, if any):

Good condition

Signed:

J. Allen Moore

Date

9/12/91

FIGURE IV.A.2 ACM REASSESSMENT FORM

REASSESSMENT OF ASBESTOS-CONTAINING MATERIALS

Location of asbestos-containing material(s) (address, building, room(s), or general description:

Type of asbestos-containing material(s):

1. Sprayed- or troweled-on ceilings or walls:
2. Sprayed- or troweled-on structural members:
3. Insulation on pipes, tanks, or boilers:
4. Other (describe):

Abatement Status:

1. The material has been encapsulated __, enclosed __, neither __.

Assessment:

1. Evidence of physical damage:

2. Evidence of water damage:

3. Evidence of delamination or other deterioration:

4. Degree of accessibility of the material:

5. Degree of activity near the material:

6. Location in an air plenum, air shaft, or airstream:

7. Other observations (including the condition of the encapsulant or enclosure, if any):

Signed: _____

Date _____

FIGURE IV.A.2

ACM REASSESSMENT FORM

REASSESSMENT OF ASBESTOS-CONTAINING MATERIALS

Location of asbestos-containing material(s) (address, building, room(s), or general description:

Type of asbestos-containing material(s):

1. Sprayed- or troweled-on ceilings or walls:
 2. Sprayed- or troweled-on structural members:
 3. Insulation on pipes, tanks, or boilers:
 4. Other (describe):
-

Abatement Status:

1. The material has been encapsulated __, enclosed __, neither __.

Assessment:

1. Evidence of physical damage:
-

2. Evidence of water damage:
-

3. Evidence of delamination or other deterioration:
-

4. Degree of accessibility of the material:
-

5. Degree of activity near the material:
-

6. Location in an air plenum, air shaft, or airstream:
-

7. Other observations (including the condition of the encapsulant or enclosure, if any):
-

Signed: _____

Date _____

FIGURE IV.A.2

ACM REASSESSMENT FORM

REASSESSMENT OF ASBESTOS-CONTAINING MATERIALS

Location of asbestos-containing material(s) (address, building, room(s), or general description):

Type of asbestos-containing material(s):

1. Sprayed- or troweled-on ceilings or walls:
2. Sprayed- or troweled-on structural members:
3. Insulation on pipes, tanks, or boilers:
4. Other (describe):

Abatement Status:

1. The material has been encapsulated __, enclosed __, neither __.

Assessment:

1. Evidence of physical damage:

2. Evidence of water damage:

3. Evidence of delamination or other deterioration:

4. Degree of accessibility of the material:

5. Degree of activity near the material:

6. Location in an air plenum, air shaft, or airstream:

7. Other observations (including the condition of the encapsulant or enclosure, if any):

Signed: _____

Date _____

FIGURE IV.A.2

ACM REASSESSMENT FORM

REASSESSMENT OF ASBESTOS-CONTAINING MATERIALS

Location of asbestos-containing material(s) (address, building, room(s), or general description:

Type of asbestos-containing material(s):

1. Sprayed- or troweled-on ceilings or walls:
2. Sprayed- or troweled-on structural members:
3. Insulation on pipes, tanks, or boilers:
4. Other (describe):

Abatement Status:

1. The material has been encapsulated __, enclosed __, neither __.

Assessment:

1. Evidence of physical damage:

2. Evidence of water damage:

3. Evidence of delamination or other deterioration:

4. Degree of accessibility of the material:

5. Degree of activity near the material:

6. Location in an air plenum, air shaft, or airstream:

7. Other observations (including the condition of the encapsulant or enclosure, if any):

Signed: _____

Date _____

II. ELEMENTS OF AN O&M PROGRAM
G. RECORDKEEPING

II. ELEMENTS OF AN O&M PROGRAM

G. RECORDKEEPING

Detailed written descriptions and proper training of workers ensures that workers understand appropriate work practices when working with or near ACM; a management system for building maintenance ensures that these practices will be employed whenever maintenance is performed. To the greatest extent possible, the implementation of the O&M program should be incorporated into the existing system for managing building operations. Approval and documentation forms should parallel those already in use, or the existing forms simply expanded to include the content of the forms illustrated here.

The management system for maintenance work in buildings with ACM should address all maintenance work, even tasks which have a low probability of disturbing ACM. (Workers should be trained to recognize when appropriate work practices for ACM are needed for these jobs.) Before any maintenance work is initiated, the person requesting the work should submit a job request form to the asbestos program manager. It contains information on the location of the requested work, the type of maintenance needed, and whether the requestor is aware of any ACM in the vicinity of the requested work. The asbestos program manager should refer to written records and building plans on which all ACM has been previously located (following the building survey) to determine/verify whether ACM is present. He or she or a designated supervisor should visit the site of the requested maintenance and determine what work practices should be instituted during the maintenance activity. This determination should then be recorded on the maintenance work approval form and the approval form sent to the in-house maintenance supervisor or to the maintenance contractor to authorize the work. A copy of both the request and the approval (if granted) should be placed in the permanent asbestos file.

For all jobs except those where contact with ACM is very unlikely, the asbestos program manager (or the designee) should visit the work site when the work is initiated to verify that the maintenance is being performed properly. For jobs where disturbance of ACM is intended or likely, periodic inspections should be made for the duration of the project. His or her observations should be reported on a work evaluation form. Any deviation from appropriate work practices should be corrected immediately. Upon completion of the work, a copy of the evaluation form should be placed in the permanent asbestos file.

The O&M management system should also address work conducted by outside contractors. Most building owners will contract for at least some custodial and maintenance services. In addition, buildings owners typically turn to asbestos contractors for assistance following major fiber release episodes. Contracts with such companies should include the following provisions to ensure that SVC or abatement workers can and will follow appropriate work practices.

- * Proof that the contractor's workers have been properly notified about ACM in the owner's building.
- * Copies of respiratory protection, medical surveillance, and worker training documentation submitted to OSHA.
- * Historical air monitoring data for representative examples of the contractor's previous projects, with emphasis on projects similar to those likely to be encountered by the building owner.
- * A resume for the crew chiefs (the "competent person" in the language of the OSHA rule).

FIGURE II.B.2.a

APPLICATION FORM FOR MAINTENANCE WORK APPROVAL

JOB REQUEST FORM FOR MAINTENANCE WORK

NAME: J. Allen Moore

DATE: 5/2/91

TELEPHONE NO. 252-2338

1. Address, building, and room number(s) (or description of area) where work is to be performed:
6200 N. Charles St - East Building boiler room
and West Building utility room
2. Requested starting date: when asked is
not in way Anticipated finish date: June 1991
3. Description of work: Encapsulation of asbestos insulation
on boiler and air handling equipment and ducts
using Jotter asbestos budget jacket # 3232
4. Description of any asbestos-containing material that might be affected, if known
(include location and type):
Smear found on asbestos insulation
5. Name and telephone number of requestor: _____
6. Name and telephone number of supervisor: _____

Submit this application to: (The asbestos program manager)

NOTE: An application must be submitted for all maintenance work whether or not asbestos- cont affected. An authorization must then be received before any work can proceed.

✓ Granted (Job Request No. 1)

_____ Denied

FIGURE II.B.2.b
MAINTENANCE WORK APPROVAL FORM

MAINTENANCE WORK APPROVAL FORM

1. AUTHORIZATION

Authorization is given to Charles T. Lilly to proceed with the following maintenance work:
Removal of asbestos insulation
in 2nd floor room and West Utility room

2. PRESENCE OF ASBESTOS-CONTAINING MATERIALS

Asbestos-containing materials are present/~~are not present~~ in the vicinity of the maintenance work.

3. WORK PRACTICES IF ASBESTOS-CONTAINING MATERIALS ARE PRESENT

The following work practices shall be employed to avoid or minimize disturbing asbestos:
Control brushing or touching insulation
after asbestos has been joint with asbestos
sheet gun

(manuals on appropriate work practices can be referenced)

4. PERSONNEL PROTECTION IF ASBESTOS-CONTAINING MATERIALS ARE PRESENT

The following equipment/clothes shall be used/worn during the work to protect workers:
Face mask

(manuals on personal protection can be referenced)

SIGNED: Allen Moore DATE: 5/2/91
(asbestos program manager)

FIGURE II.B.3
EVALUATION OF WORK AFFECTING
ASBESTOS-CONTAINING MATERIALS

This evaluation covers the following maintenance work:

1. Location of work (address, building, room number(s), or general description):
1200 N. Charles St. - East Building boiler room
and West Building Utility Room
2. Date(s) of work: June 1991
3. Description of work: 2 coats of Deter Adhesive bridging joint
using Vaiden spray gun Net
4. Work approval form number: _____

Evaluation of work practices employed to minimize disturbance of asbestos:

Good

Evaluation of work practices employed to contain released fibers and to clean up the work area:

Good

Evaluation of equipment and procedures used to protect workers:

Good

SIGNED: J. Allen Mann DATE: 7/1/91
(asbestos program manager)

ADDITIONAL CLEANING, PERIODIC SURVEILLANCE, REINSPECTION, O&M PLAN

1. **Additional cleaning** in accordance with **40 CFR 763.91(c)(2)**

is _____ is not _____ recommended.

Additional cleaning, in areas indicated below:

a. _____

b. _____

c. _____

shall be conducted on the following schedule in accordance with the Work Practices for Cleaning Activities.

Additional Cleaning Schedule

_____ Monthly _____ Every six months _____ Annually

NOTE: IF ADDITIONAL CLEANING IS RECOMMENDED THE MANAGEMENT PLANNER MUST RECOMMEND THE METHOD(S) TO BE USED. LIST SEPARATELY.

LEA ☒ AGREES _____ DOES NOT AGREE WITH
THE ABOVE CLEANING RECOMMENDATION(S).

Periodic Surveillance -

At least once every 6 months after a management plan is in effect, periodic surveillance **will** be conducted.

Reinspection -

At least once every 3 years after a management plan is in effect, a reinspection **will** be conducted of all friable and nonfriable asbestos containing material. Each reinspection **must** be made by an accredited inspector.

Operations & Maintenance Plan

A site-specific Operations and Maintenance Plan **must** be included in the management plan if needed.

Assignment

Article I - Contract Price: The Customer shall pay AMA, Inc. the lump sum, unit price or other consideration set forth in Exhibit B attached hereto and incorporated herein by reference. Customer shall have no right to set off or recoupment. Customer may back-charge only after giving fourteen (14) days written notice of any act, omission or occurrence claimed to provide a basis therefor and affording AMA, Inc. an opportunity to cure. In no event, however, shall customer back-charge for any act, omission or occurrence not described in writing within fourteen (14) days after the date of such act, omission or occurrence. The Contract Price does not include the cost of any performance or payment bond or any other bond required to perform the work under the Agreement. Customer shall reimburse AMA, Inc. for the cost of any such bond plus 20%.

Article II - Force Majeure: Except for the obligation to pay for services rendered, neither party hereto shall be liable for its failure to perform hereunder due to contingencies beyond its reasonable control, including, but not limited to, strikes, riots, war, fire, acts of God, compliance with any law, regulation or order, whether valid or invalid, of the United States of America or any other governmental body or any instrumentality thereof, whether now existing or hereafter created.

Article III - Brown Memorial Woodbrook Presbyterian Church and AMA, Inc. bind themselves, their partners, successors, assigns, and legal representatives to the other party to this Agreement and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants of this Agreement. Brown Memorial Woodbrook Presbyterian Church or AMA, Inc. shall not assign, sublet or transfer any interest in this Agreement without written consent of AMA, Inc..

Article IV - Savings Clause: In case any one or more of the provisions contained in this Agreement shall, for any reason, be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision of this Agreement; this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

Article V - Insurance: Where applicable Customer agrees to name AMA, Inc. as an additional insured on all policies. Customer's insurance is primary and AMA, Inc.'s insurance to be excess and not contributory.

Article VI - Payment: The Customer agrees to make full payment at the office of AMA, Inc. specified on such invoice within thirty (30) days after receipt of AMA, Inc.'s statement. AMA, Inc. shall be entitled to interest at the maximum legal rate, or at the rate of eighteen percent (18%) per annum if there is no maximum legal rate, on any payment not received within such thirty (30) days. AMA, Inc. where applicable will progress bill. The customer will reimburse AMA, Inc. all costs including overhead, attorney's fees, etc. incurred to collect payments over 30 days from the date of the invoice.

Article VII - Customer Indemnity: Customer hereby agrees to indemnify and hold AMA, Inc., its officers, directors, employees, agents and affiliates, harmless from and against any and all loss, damage, suits, liability and expenses (including, but not limited to, reasonable investigation and legal expenses and attorney's fees) arising out of any claim for loss of or damage to property, including AMA, Inc.'s property, and injuries to or death of persons, including AMA, Inc.'s employees caused by, resulting from, growing out of or incidental to the Customer's negligence or willful misconduct or the Customer's willful or innocent misrepresentation of the characteristics of the Conditions, and shall at the option of AMA, Inc. defend AMA, Inc. at the Customer's sole expense in any litigation involving the same.

Article VIII - Limitation of Damages: Notwithstanding the provisions of Article VII, AMA, Inc. shall not be liable for any special, consequential, or punitive damages in connection with its performance or non-performance under this Agreement. AMA, Inc.'s damages, for any and all acts, are limited to the amount of their insurance.

Article IX - Joint Liability and Subrogation: If AMA, Inc. and Customer are both entitled to indemnity but Customer has breached by misrepresenting the characteristics of the Site Conditions, AMA, Inc. and Customer agree, by way of apportionment of the respective responsibilities, that the amount of indemnity payable by Customer shall be equal to that amount of damages which would not have arisen but for such breach by Customer. Nothing herein shall be interpreted or deemed to limit, in any way, any right or action which may be asserted by any party against publicly or privately created funds established for the purpose of satisfying, wholly or in part, claims asserted by persons referenced herein.

In the event that any third party, inclusive of any governmental agency, asserts any claim, demand or cause of action arising out of the performance of this Agreement, whether for governmental violations certifications, approvals or other interests of the Customer, Customer agrees to maintain for the joint and mutual benefit of the Customer and AMA, Inc. any rights that the Customer may have resulting from either (i) an action against or (ii) a hold harmless or indemnification agreement with any other contractors.

Article X - Health, Safety and First Aid: Customer places and requires AMA, Inc. to place the highest importance and priority on health and safety for all services performed by AMA, Inc. at any Customer facility. At all Customer facilities, AMA, Inc. shall comply with all applicable fire, safety and health laws and regulations as well as any safety and health requirements of Customer at such facility as to which printed copies have been delivered by Customer to AMA, Inc.'s supervisory or management personnel contemporaneously with entry into this Agreement. AMA, Inc. shall ensure that all of their employees are made aware of all safety, fire and health requirements and regulations applicable to the work to be performed pursuant to this Agreement. Customer shall furnish AMA, Inc. with copies of all safety and health requirements of Customer which relate particularly to the services AMA, Inc. has been requested to perform, and to the general safety of any particular Customer facility and shall hold such safety briefings, at Customer's expense, as Customer deems necessary prior to commencement of any work under this Agreement.

AMA, Inc. shall not permit to exist a hazardous, unsafe, unhealthy or environmentally unsound condition or activity over which it has control and knowledge at a Customer facility. In the event AMA, Inc. becomes aware of any such condition or activity, it shall promptly notify Customer and immediately take whatever steps are necessary to eliminate, terminate, abate or rectify such condition. If Customer becomes aware of such condition or activity before it is known to AMA, Inc., it shall notify AMA, Inc. and request AMA, Inc.'s prompt corrective action. Customer shall take prompt corrective action with respect to any hazardous, unsafe, unhealthy or environmentally unsound condition or activity resulting from its activities or operations. Each party shall cooperate with the other to eliminate, terminate, abate and rectify any such condition.

In the case of any emergency, Customer shall make emergency first aid and related services available to the employees of AMA, Inc. to the same extent that such emergency first aid and related services would be available to an employee of Customer located at the same facility. Nothing contained herein shall be construed as imposing any duty upon Customer to provide such emergency first aid treatment or related services to AMA, Inc.'s employees where such emergency first aid treatment or related services are not already available to an employee of Customer at a Customer facility.

Article XI - No Waiver: Failure of AMA, Inc. to enforce any right or condition of the Agreement, in one or more instances, shall not be construed as thereafter waiving any right or condition.

Article XII - AMA, Inc. informs Customer that hazardous materials have varying degrees of safe levels to which humans can be exposed to. In some cases no safe level of exposure to a specific hazardous material is known. Exposure to hazardous materials may cause serious health problems and certain types of cancer. Therefore AMA, Inc. recommends that our services be specified to be performed to the highest standards of the state-of-the-art of environmental sampling, monitoring and analysis. The customer's decision to require such performance to any lesser standard, according to a specification not written, or expressly accepted in writing, by AMA, Inc. shall relieve AMA, Inc. of responsibility for any and all loss, damage, injury, harm, suits, liability and expenses (including but not limited to reasonable investigation and legal expenses and attorney's fees) arising out of any claim for loss or damage to property, including AMA, Inc.'s property, and injuries, and all illnesses (including death) to any person caused by, or resulting from, customer's conduct and instructions.

Article XIII - AMA, Inc. expressly limits its liability for alleged failure to perform services requested by the customer to the refund of monies received therefor and AMA, Inc. shall not be liable for any special, incidental and/or consequential damages arising from the performance or non-performance under any Agreement between AMA, Inc. and Customer.

Article XIV - There may arise emergency situations whereby customer may contact AMA, Inc. to appear at customer's designated location for immediate



**air
analysis
associates, inc.**

1005 West 36th Street
Baltimore, Maryland 21211-2416
410-366-0250
FAX: 410-235-6240

LABORATORY ANALYSIS REPORT

CLIENT: BROWN MEMORIAL CHURCH
6200 NORTH CHARLES STREET
BALTIMORE, MD 21212

DATE: 03-03-93

CLIENT NO. 1804

PROJECT NO. 2245

PROJECT SITE: 6200 NORTH CHARLES STREET
BALTIMORE, MD

ANALYTE		AIRBORNE FIBERS	REPORT NO. 26162	
SAMPLE DATE	LABORATORY NUMBER	LOCATION	VOLUME (L)	RESULTS F/CC
07-30-93	8JW-07-023	OUTSIDE WORK AREA - CRAWL SPACE - AT ENTRANCE TO WORK AREA	1160	.001
07-30-93	8JW-07-024	CRAWL SPACE - PERSONAL: ZEBAL STEPPE SS #216-92-7313 - HALF-MASK RESPIRATOR	1100	.004
07-30-93	8JW-07-025	CRAWL SPACE WORK AREA - ATTACHED TO HORIZONTAL LINE DURING GLOVE BAGGING	1080	.005
07-30-93	8JW-07-026	OUTSIDE WORK AREA - MECHANICAL ROOM - AT ENTRANCE TO CLEAN ROOM OF DECONTAMINATION CHAMBER	1010	.002
07-30-93	8JW-07-027	PERSONAL: JAMES COUGH SS #216-62-1448 - HALF-FACE RESPIRATOR - MECHANICAL ROOM	920	.007
07-30-93	8JW-07-028	WORK AREA - MECHANICAL ROOM - IN CENTER OF AREA	1030	.005

AL = ACTION LEVEL

EPA = ENVIRONMENTAL PROTECTION AGENCY

L = LITERS

NFO = NO FIBERS OBSERVED IN 100 FIELDS

OSHA = OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

PEL = PERMISSIBLE EXPOSURE LIMIT

RL = RECOMMENDED LEVEL

TCTQ = TOO CLUTTERED TO QUANTIFY

	<u>IWA</u>
OSHA - PEL:	0.2 F/CC
AL:	0.1 F/CC
EPA - RL:	0.01 F/CC
MARYLAND CLEARANCE LEVEL:	<0.01 F/CC

THE DETECTION LIMIT USING NIOSH 7400 METHOD PHASE CONTRAST MICROSCOPY IS 0.01 FIBERS PER CUBIC CENTIMETER (F/CC) BASED ON TEN OR MORE FIBERS PER 100 FIELDS AND 500 LITERS OF AIR. UNLESS REQUESTED IN WRITING, SAMPLES ARE DESTROYED IN 10 DAYS. ALL CASSETTES USED ARE 25MM DIAMETER UNLESS OTHERWISE NOTED.

ANALYST: J. WARD, IH
LAB DIRECTOR: IRVIN A. FISCHER, CIH, CSP, RES

COLLECTED BY: 11111



**air
analysis
associates, inc.**

1005 West 36th Street
Baltimore, Maryland 21211-2416
410-366-0250
FAX: 410-235-6240

LABORATORY ANALYSIS REPORT

CLIENT: BROWN MEMORIAL CHURCH
6200 NORTH CHARLES STREET
BALTIMORE, MD 21212

DATE: 08-03-93

CLIENT NO. 1804

PROJECT NO. 2245

PROJECT SITE: 6200 NORTH CHARLES STREET
BALTIMORE, MD

ANALYTE		AIRBORNE FIBERS	REPORT NO. 26163	
SAMPLE DATE	LABORATORY NUMBER	LOCATION	VOLUME (L)	RESULTS F/CC
07-30-93	8JW-07-029	TUNNEL CRAWL SPACE - CENTER OF AREA	800	NFO
07-30-93	8JW-07-030	MECHANICAL ROOM - ON TOP OF LADDER IN CENTER OF AREA	800	.003

THESE SAMPLES ARE FINALS

AL = ACTION LEVEL
EPA = ENVIRONMENTAL PROTECTION AGENCY
L = LITERS
NFO = NO FIBERS OBSERVED IN 100 FIELDS

OSHA = OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PEL = PERMISSIBLE EXPOSURE LIMIT
RL = RECOMMENDED LEVEL
TGTQ = TOO CLUTTERED TO QUANTIFY

IWA
OSHA - PEL: 0.2 F/CC
AL: 0.1 F/CC
EPA - RL: 0.01 F/CC
MARYLAND CLEARANCE LEVEL: <0.01 F/CC

THE DETECTION LIMIT USING NIOSH 7400 METHOD PHASE CONTRAST MICROSCOPY IS 0.01 FIBERS PER CUBIC CENTIMETER (F/CC) BASED ON TEN OR MORE FIBERS PER 100 FIELDS AND 500 LITERS OF AIR. UNLESS REQUESTED IN WRITING, SAMPLES ARE DESTROYED IN 30 DAYS. ALL CASSETTES USED ARE 25MM DIAMETER UNLESS OTHERWISE NOTED.

ANALYST: J. WARD, IH
LAB DIRECTOR: IRVIN A. FISCHER, CIH, CSP, RES

COLLECTED BY: 11111